WHAT IS CLAIMED IS:

1. A microdissection apparatus to obtain a necessary area from a sample, comprising:

a laser light source to emit laser light; and

a laser light irradiation optical system to irradiate the sample with the laser light from the laser light source,

the laser light irradiation optical system including an active optical element, which is allowed to form a pattern reflecting the necessary area, and

the laser light irradiation optical system setting a laser light irradiation area, to which the laser light is applied, based on the pattern formed on the active optical element.

2. The microdissection apparatus according to claim 1, further comprising a pattern image projection optical system, which projects an image of the pattern formed on the active optical element onto the sample.

3. The microdissection apparatus according to claim 2, further comprising an observation optical system, which acquires an observation image of the sample.

4. The microdissection apparatus according to claim 3, further comprising display unit to display the observation image acquired by the observation optical system, and input unit to input information for setting the pattern formed on the active optical element.

5. The microdissection apparatus according to claim 3, further comprising control unit to set the pattern formed on the active optical element based on the observation image acquired by the observation optical system.

6. The microdissection apparatus according to claim 1, wherein the laser light irradiation optical system selectively irradiates the part of the sample that surrounds the necessary area with the laser light in accordance with the pattern formed on the active optical element, the laser light applied to the sample has energy density sufficient for evaporating the sample, and the part of the sample irradiated with the laser light is evaporated so that necessary area is cut from the sample.

7. The microdissection apparatus according to claim 1, wherein the laser light irradiation optical system includes an objective lens arranged close to the sample, a relay lens to be appropriately arranged on an optical path between the active optical element and the objective lens, and a relay lens attachment/detachment mechanism to attach/detach the relay lens to/from the optical path,

in a state that the relay lens is positioned on the optical path, the active optical element forms the pattern reflecting the necessary area, and the laser light irradiation optical system selectively irradiates

a part of the sample excluding the necessary area with the laser light in accordance with the pattern formed on the active optical element, and

in a state that the relay lens is off the optical path, the laser light irradiation optical system converges the beam of laser light by the objective lens to irradiate the sample with the converged beam.

8. The microdissection apparatus according to claim 7, wherein, in the state that the relay lens is off the optical path, the beam of laser light, which is converged by the objective lens to illuminate the sample, has energy density sufficient for evaporating the sample.

9. The microdissection apparatus according to claim 8, further comprising movement mechanism, which relatively moves a beam spot of the laser light formed on the sample and the sample, wherein the beam spot of the laser light is relatively moved on the sample by the movement mechanism to surround an area to be collected including the necessary area, and a part of the sample irradiated with the laser light is evaporated to be cut, so that the area to be collected including the necessary area is cut from the sample.

10. The microdissection apparatus according to claim 1, wherein the active optical element comprises a transmission type active optical element.

11. The microdissection apparatus according to

claim 1, wherein the active optical element comprises a reflection type active optical element.

12. A microdissection apparatus to obtain a necessary area from a sample, comprising:

a light source means for emitting laser light; and

a laser light irradiation optical system to irradiate the sample with the laser light from the light source means,

the laser light irradiation optical system including pattern forming means for forming a pattern reflecting the necessary area, and

the laser light irradiation optical system setting a laser light irradiation area, to which the laser light is applied, based on the pattern formed by the pattern forming means.

13. The microdissection apparatus according to claim 12, further comprising a pattern image projection optical system for projecting an image of the pattern formed by the pattern forming means onto the sample.

14. The microdissection apparatus according to claim 13, further comprising an observation optical system for acquiring an observation image of the sample.

15. The microdissection apparatus according to claim 14, further comprising displaying means for displaying the observation image acquired by the observation optical system, and inputting means for

inputting information for setting the pattern formed by the pattern forming means.

16. The microdissection apparatus according to claim 14, further comprising controller for setting the pattern formed by the pattern forming means based on the observation image acquired by the observation optical system.

17. The microdissection apparatus according to claim 12, wherein the laser light irradiation optical system selectively irradiates the part of the sample that surrounds the necessary area with the laser light in accordance with the pattern formed by the pattern forming means, the laser light applied to the sample has energy density sufficient for evaporating the sample, and the part of the sample irradiated with the laser light is evaporated so that necessary area is cut from the sample.

18. The microdissection apparatus according to claim 1, wherein the laser light irradiation optical system includes an objective lens arranged close to the sample, a relay lens, which is appropriately arranged on an optical path between the pattern forming means and the objective lens, and a relay lens attachment/detachment mechanism, which attaches/detaches the relay lens to/from the optical path,

in a state that the relay lens is positioned on

the optical path, the pattern forming means forms the pattern reflecting the necessary area, and the laser light irradiation optical system selectively irradiates a part of the sample excluding the necessary area with the laser light in accordance with the pattern formed on the pattern forming means, and

in a state that the relay lens is off the optical path, the laser light irradiation optical system converges the beam of laser light by the objective lens to irradiate the sample with the converged beam.

19. The microdissection apparatus according to claim 18, wherein, in the state that the relay lens is off the optical path, the beam of laser light, which is converged by the objective lens to illuminate the sample, has energy density sufficient for evaporating the sample.

20. The microdissection apparatus according to claim 19, further comprising moving means for relatively moving a beam spot of the laser light formed on the sample and the sample, wherein the beam spot of the laser light is relatively moved on the sample by the moving means to surround an area to be collected including the necessary area, and a part of the sample irradiated with the laser light is evaporated to be cut, so that the area to be collected including the necessary area is cut from the sample.

21. The microdissection apparatus according to

claim 12, wherein the pattern forming means comprises a transmission type active optical element.

22. The microdissection apparatus according to claim 12, wherein the pattern forming means comprises a reflection type active optical element.

23. A microdissection method for obtaining a necessary area from a sample, comprising

irradiating the sample with laser light through an active optical element, which is allowed to form a pattern reflecting the necessary area.

24. The microdissection method according to claim 23, wherein a part of the sample which surrounds the necessary area is selectively irradiated with laser light in accordance with the pattern formed on the active optical element and it is evaporated, thereby cutting the necessary area from the sample.

25. The microdissection method according to claim 24, wherein an image of the pattern formed on the active optical element is projected onto the sample,

an observation image of the sample is obtained, and

a pattern formed on the active optical element is set based on the obtained observation image.

26. The microdissection apparatus according to claim 23, wherein a part of the sample excluding the necessary area is selectively irradiated with the laser light in accordance with the pattern formed on the

active optical element,

the selective irradiation of the laser light is repeatedly performed while changing positions according to needs, and

a beam spot of the laser light formed on the sample is relatively moved on the sample while converging a beam of laser light and irradiating the sample with the converged beam to surround the area to be collected including the necessary area, the part of the sample irradiated with the laser light is evaporated, and the area to be collected including the necessary area is cut from the sample..